PHOENIX CONTACT
INSPIRING INNOVATIONS

MCR-SWS/U
MCR-SWS/I

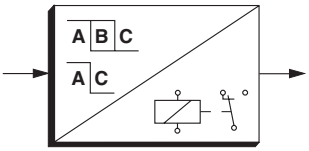
Limit Value Switches

INTERFACE

Data Sheet

Description

– Relay/transistor output
– Limit indicator
– Selectable hysteresis



The MCR-SWS limit value switch is used to monitor simple automation processes. Standard analog signals 0 V to 10 V or 0 mA to 20 mA are processed on the input side.

The single-ended current input can be isolated using jumpers and therefore used as a differential current input. Using the differential input, several limit value switches can be connected in series to monitor the current level.

From the analog input signals 0 V to 10 V or 0(4) mA to 20 mA, a setpoint (limit value) is set in the module using a potentiometer. If the input signal reaches the setpoint (limit value), a relay contact is closed at the output.

After the setpoint (limit value) has been set, the required hysteresis can be set using another potentiometer. Both switching points control a relay. Simple automation processes can be monitored using the changeover contact.

The three signal area states (A, B, and C) – below, within, and above the hysteresis – are provided as transistor outputs for monitoring. LEDs indicate the three signal areas.

The modules are 17.5 mm wide, have robust screw and plug-in connections, and can be mounted on all commonly used DIN rails.

Make sure you always use the latest documentation.
It can be downloaded at www.download.phoenixcontact.com.

A conversion table is available on the Internet at
www.download.phoenixcontact.com/general/7000_en_00.pdf.

This data sheet is valid for all products listed on the following page:

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Ordering Data

Description	Type	Order No.	Pcs./Pkt.
MCR limit value switch, with selectable hysteresis and relay/transistor output, 0 V ... 10 V input signal	MCR-SWS/U	2766465	1
MCR limit value switch, with selectable hysteresis and relay/transistor output, 0(4) mA ... 20 mA input signal	MCR-SWS/I	2766478	1

Technical Data

Input	MCR-SWS/U	MCR-SWS/I
Input signal	0 V ... 10 V	0(4) mA ... 20 mA
Input resistance	≥ 100 kΩ	≤ 120 Ω
Setting potentiometer	270° potentiometer with scale	270° potentiometer with scale
Setting range for the setpoint	0 V ... 10 V	0 mA ... 20 mA
Setting range for the hysteresis	0.1 V ... 10 V	0.2 mA ... 20 mA
Setting precision for the hysteresis	±30 mV	±60 µA
Internal hysteresis at the lower/upper switching point	30 mV	60 µA

Output	
Transistor level	PNP outputs
Output voltage	20 V DC ... 30 V DC
Max. output current	100 mA
Relay level	
Type of contact	1 form C contact
Max. switching voltage / switching current	250 V AC / 2 A; 30 V DC / 2A
Cycles, mechanical	10 x 10^6

General Data	
Supply voltage	20 V DC ... 30 V DC
Current consumption	60 mA
Temperature coefficient	≤ 0.02%/K
Step response (10% ... 90%)	< 0.025 s
Ambient operating temperature range	-20°C ... +65°C
Conductor cross section	0.2 mm^2 ... 2.5 mm^2
Electromagnetic compatibility	CE conformance

Conformance With EMC Directive 89/336/EEC in Accordance With EN 61000-6-2 and EN 61000-6-4		
Immunity to Interference in Accordance With EN 61000-6-2[1]		
Electrostatic discharge (ESD)	EN 61000-4-2	8 kV air discharge[2]
Electromagnetic HF field		
Amplitude modulation	EN 61000-4-3	10 V/m
Pulse modulation	EN 61000-4-3	10 V/m
Fast transients (Burst)	EN 61000-4-4	Input/Output/Supply 2 kV/5 kHz[2]
Surge current loads (Surge)	EN 61000-4-5	Supply: 0,5 kV/2 Ω[2]
Conducted interference	EN 61000-4-6	Input/Output/Supply 10 V
Noise Emission in Accordance With EN 61000-6-4		
Noise emission of housing	EN 55011[3]	Class A[4]

[1] EN 61000 corresponds to IEC 1000

[2] Criterion B: Temporary impairment to operational behavior that is corrected by the device itself.

[3] EN 55011 corresponds to CISPR11

[4] Class A: Industrial application, without special installation measures.

Structure

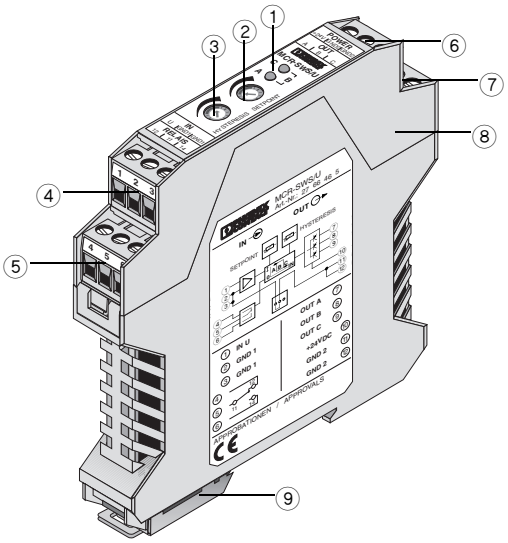


Figure 1 Structure

1 LEDs for switching transistor areas
2 Limit value potentiometer
3 Hysteresis potentiometer
4 Signal input (plug-in screw-cage terminal block)
5 Relay output (plug-in screw-cage terminal block)
6 Switching transistor outputs (plug-in screw-cage terminal block)
7 Power supply (plug-in screw-cage terminal block)
8 Upper part of the housing can be removed to set the jumpers
9 Metal lock for fastening on the DIN rail

Dimensions

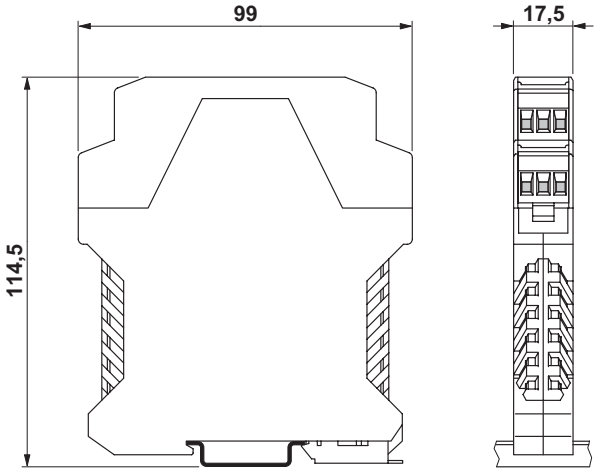


Figure 2 Dimensions (in mm)

Block Diagram

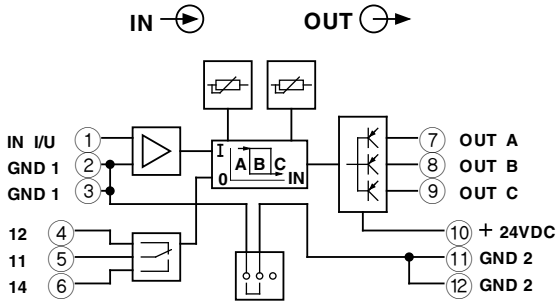


Figure 3 Block diagram

Setting the Hysteresis

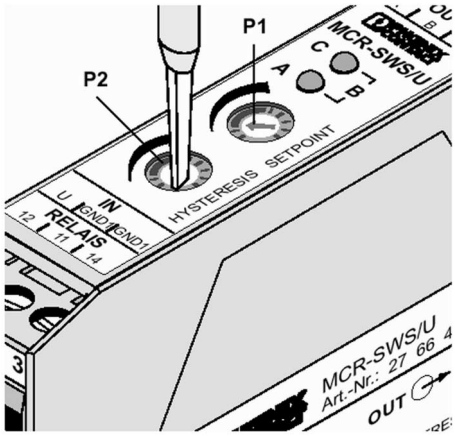


Figure 4 Setting the hysteresis

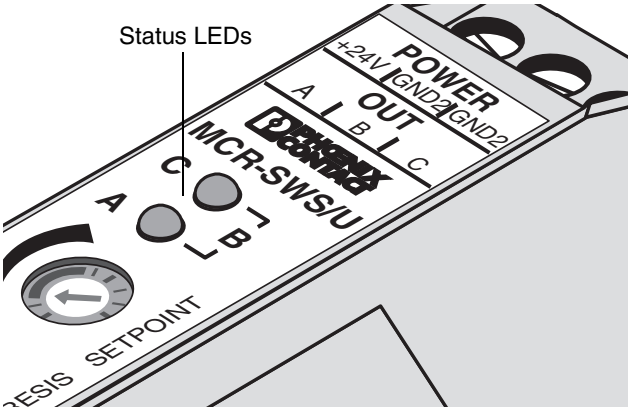


Figure 5 Status-LEDs

Area A: Underrange 

Area B: Within range (hysteresis) 

Area C: Overrange 

Figure 6 Checking the setting

Example:

Switching point 5 V, hysteresis ±1 V (4 V to 6 V)
or switching point 10 mA, hysteresis ±2 mA

- Turn both potentiometers (setpoint P1 and hysteresis P2) as far to the left as possible.
- Send a signal (5 V or 10 mA) which corresponds to the setpoint to the signal input (U_{IN} or I_{IN}). LED C lights up.
- Turn P1 to the right until both LEDs light up (area B).
- Send a signal (4 V or 8 mA) which corresponds to the lower hysteresis to the signal input (U_{IN} or I_{IN}). LED A lights up.
- Turn P2 to the right until both LEDs light up.

Check (see Figure 6):

The exact setting has been made if the following criteria have been met:

– Transition from area A (LED A) to area B (both LEDs) is 4 V ±15 mV or 8 mA ±30 µA for a rising signal (0 V → 10 V or 0 mA → 20 mA).

– Transition from area B (both LEDs) to area C (LED C) is 6 V ±15 mV or 12 mA ±30 µA.

Deviations are caused by the internal hysteresis of 30 mV or 60 µA.

Setting Differential Mode on the MCR-SWS/I

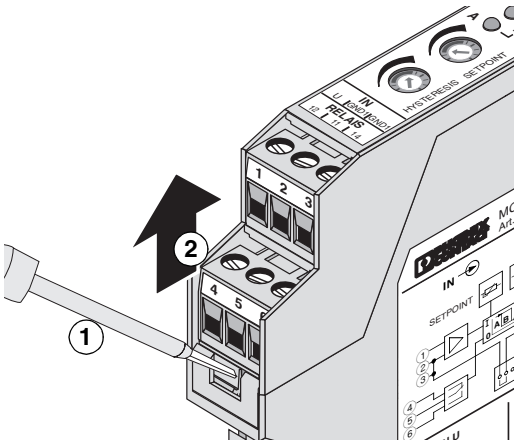


Figure 7 Opening the device

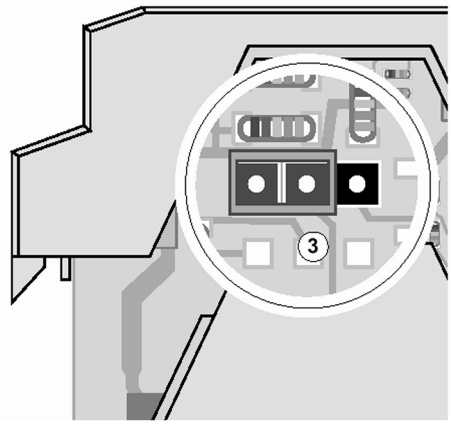
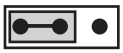


Figure 8 Setting the jumper

Single-ended input 

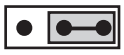
Input in differential mode 

Figure 9 Jumper configuration

The input can be switched to differential mode to enable several limit value switches with **current input 0 mA to 20 mA** to be connected in series.

The module is fitted with a single-ended input as standard.

Opening the Device

- Loosen the fastenings on both sides of the upper part of the housing using a screwdriver ①.
- Pull out the upper part of the housing and the electronics approximately 3 cm ②.

Setting the Jumper (see ③ in Figure 8)

- To switch to differential mode, set jumper J to position D.
- After the setting has been made, push the upper part of the housing back in until it locks into place.

Jumper Configuration (corresponding to the module view in Figure 8):

Single-ended input

Position D = input in differential mode

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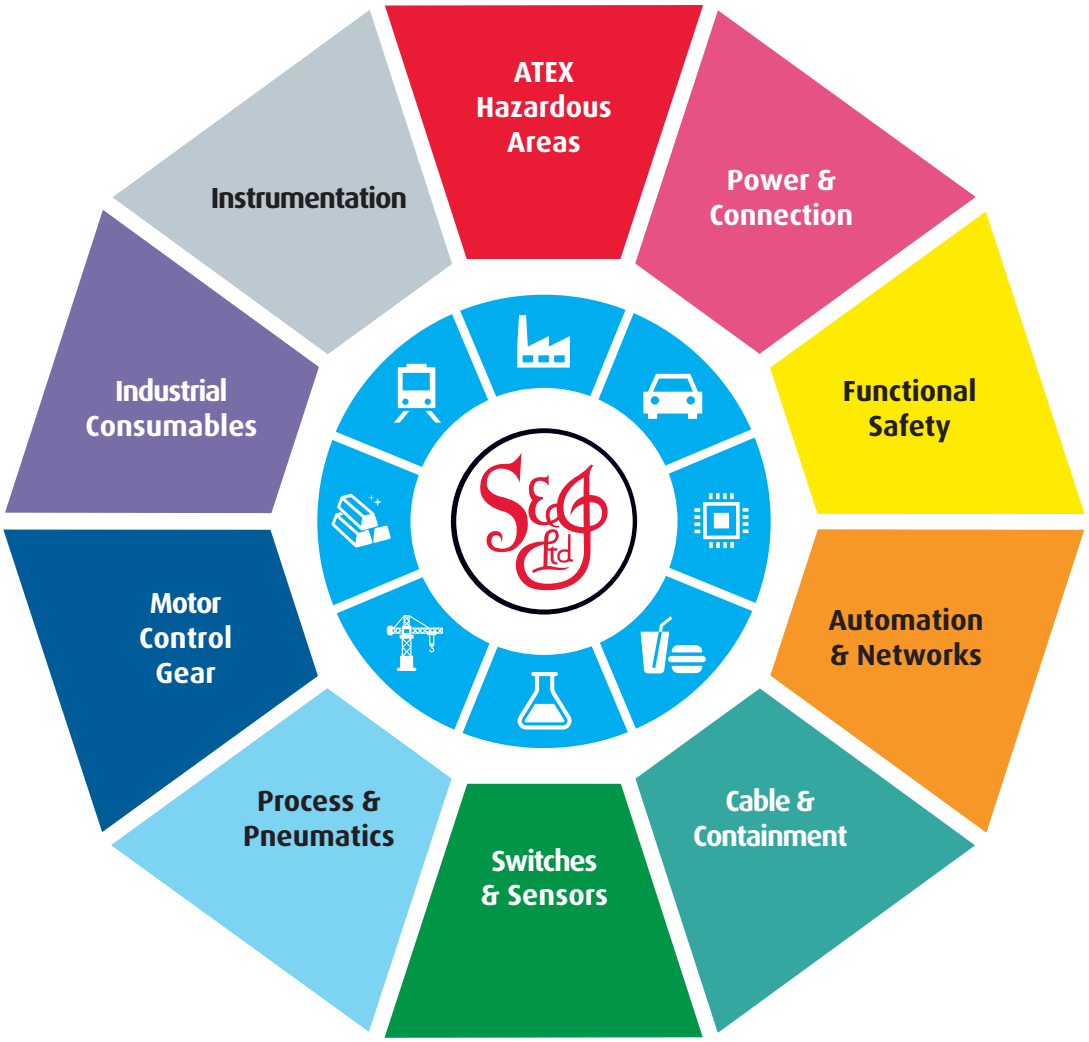

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